land mass and is not scheduled to be operational until 2004. The reason I am not going to dive too deep into the system is that fact that it will be a long time before the system design details are frozen. The current strategy looks good, having all satellites acting as independent nodes in a packet network with the ability to communicate with adjacent satellites. This sounds like a robust data delivery architecture, with the ability to route around satellite failures and other reception problems. But, in a press release, Teledesic said it is exploring early market entry strategies. This could change the look of the final Teledesic product. For example, Craig McCaw (Teledesic chairman) has invested heavily in ICO, a LEO satellite telephone system. The satellites for this system utilize a 'bent pipe' channel design that would allow any type of data modulation scheme to be transmitted through the satellites .... including low bandwidth Internet requests. All you need is a broadband geostationary satellite to deliver the return data to the user and you have a 2 way satellite internet system that is a lot simpler than launching 288 satellites. I have no actual data to prove that this is what Craig McCaw had in mind when he invested in ICO, but it looks like a reasonable assumption.

Affordable broadband satellite access to the Internet is just around the corner. And not a minute too soon for people who live and work in remote and rural areas underserved by land based service providers.

Previous Features

ORIGINAL

NewsEdge

VIA Satellite
March 12, 2001

DBS Plays hardball/ Can Satellite Go Head-To-Head With Cable?

VIA Satellite via NewsEdge Corporation : by Jimmy Schaeffler

When viewing the basic data that underlies the growth of today's U.S. Direct Broadcast Satellite (DBS) industry, the numbers are impressive, no matter where your bias lies. Launched in early 1994, this six-year-old amateur player has moved rapidly to professional status, and today brings signals into one out of every seven U.S. TV households. In fact, dishes of 39 inches or smaller have found their way into almost 15 million of the U.S.'s 102 million TV Households (TVHHs), as of year end 2000.

For the year just passed, The Carmel Group's estimates show El Segundo, CA-headquartered DirecTV added slightly more than 1.9 million net new subscribers, while Littleton, CO-based Echostar added almost 50,000 fewer, and together they added a record of almost four million new participants to the U.S. digital satellite experience. That figure amounts to 315,000 new subscribers on average per month, 72,600 per week, and 10,350 per day, during calendar year 2000. Additionally, revenue per subscriber has risen handsomely and, relative to its rivals (especially cable), DBS's churn has remained quite small. Compared to cable, DirecTV and Echostar separately added more new subscriber accounts in the last year of the old millennium, than did the entire nation's thousands of cable system operators combined.

That said, however, the U.S. DBS industry today faces a most critical fork in the road: In order to propel itself and mature as an industry, DBS must truly begin rivaling the 45-year-old U.S. cable industry, head-to-head, in every market.In order to achieve that tall order, DBS has to 1) provide solid customer service, and 2) deliver new products and services that make existing customers want to stay and make non-customers want to subscribe.

Spending For Service

Taking that two-fold challenge apart, the first chore requires that DirecTV and Echostar continue to dedicate substantial sums toward call management centers, and toward training and paying thousands of subscriber management system representatives to sell their wares and solve their consumers' problems. According to studies by consumer surveyor, J.D. Powers & Associates, DBS's money has been well-spent. Year after year, each DBS provider continues to significantly surpass cable's best when it comes to basic customer service. This, in turn, creates remarkable good will for satellite TV, at a time when cable is still struggling to improve its customer service. Customer surveys say that customer satisfaction arises largely from the ability of satellite providers to adequately address their problems and issues more readily than the competition.

Additional customer service possibilities call for offerings that will allow consumers to go online in order to serve their own needs. In fact, DirecTV and Echostar are looking at Web site changes that will take customer services beyond what is typically offered by both companies today, such as the myriad information about each company, its services and products, and the standard Q&A pages. These new Web site services will include the capability of paying and reviewing bills and/or programming information at home, and many other yet-to-be developed and implemented innovations. Additionally, DirecTV is looking at customer segmentation, whereby those subscribers who are most loyal and pay the most money--those with a premium package and who are signed up to the NFL Sunday Ticket package--will be studied and specially served to

further enhance their satellite TV experiences (and spending).

On another level, unlike DirecTV and several large cable operators, Echostar focuses its revenues and energies on building and operating its own customer service centers, believing that ownership and direct control is the key to employee and customer retention and acquisition. Echostar claims that its call management center workers have dishes themselves, have a share in the company, and only deal with Echostar's products and services, thus they know the product and the subscriber better, and can do a better job of providing the best customer service in the industry. Echostar also believes that this practice is the most cost effective, which it professes Wall Street favors, as well.

Closely related to basic customer service is the idea of designing and implementing new services only on the condition they are simple and not confusing to the overwhelming base of subscribers. A perfect example is Electronic Programming Guide software that is designed to be unbelievably intuitive and responsive to customer solutions. Notes former SBCA Chairman and U.S. Satellite Broadcasting CEO Stanley Hubbard, "It's incumbent on system operators to help their subscribers understand what these networks are. And it's incumbent on programmers to help all subscribers use these channels. Quality and value are the only propositions. Make the customer feel smart, not dumb. Tell them what to watch, so they can get the value from their subscription. Do that in everything you do, in every communication with that customer."

An additional customer service challenge deals with the satellite industry's efforts to properly install new set-tops and other equipment. Satellite TV installers have too often shown a marked unfamiliarity with the new products coming into the market, and a lack of experience in melding together all the new devices. This is a problem that will only increase, especially with numerous new devices typically coming from a whole set of different manufacturers. To fill this service vacuum, protocols like the Satellite Broadcasting and Communications Association's (SBCA) Installer Training and Certification Program and other efforts by the SBCA's Retail Council are absolutely critical. Ironically, steps like these will also impact the cable industry, as it moves towards its own additional level of set-top box and related device installations.

Adding Services

The next chore for the U.S. DBS industry involves adding cost-effective new services, especially in the category of Advanced Interactive Multimedia (AIM) services. From the early beginnings in the early 1990s, DBS's mantra has always been "affordable choice." As championed by founders Eddy Hartenstein and Bill Butterworth, the very nature of the early DirecTV system was one of more channels, better quality sound and picture, and at prices that clearly succeeded in battling the typical cable subscriber inertia that keeps even dissatisfied cable customers from switching to DBS. The 2000 introduction of local-into-local satellite-delivered network signals to almost 60 percent of America's 280 million inhabitants is a perfect example of adding these new cost-effective services. In 2001, that mantra will be fully tested, as both DirecTV and Echostar roll out or further implement their own versions of new AIM services. Echostar will continue to introduce its Starband two-way broadband service, which wil

l join the WebTV, Wink, and OpenTV services it already offers its estimated 5.3 million year-end 2000 subscribers. Echostar will also push its Digital Video Recording--a.k.a.: Personal Video Recorder (PVR) and Personal TV service--via a new set-top box offering up to 30 hours of programming storage capacity. In addition, Echostar in third quarter 2001, will introduce data-to- the-computer-by satellite, via its 1999 alliance with broadband provider, Geocast.

In its own right, GM Hughes (GMH) will further deploy its two-way Hughes Network Systems' (HNS) DirecPC Internet service. Meanwhile, HNS's sister company, DirecTV, will further deploy its combination DirecTV-TiVo boxes, together with its own TiVo and Wink services, to DirecTV's almost 10 million subscribers (as of year-end 2000). DirecTV will also introduce its AOLTV and Microsoft Ultimate TV AIM services during 2001. Finally, both GMH services are expected to also begin offering the recently-acquired Telocity broadband services to subscribers nationwide during 2001, which will provide two-way digital subscriber line (DSL) capability, thus

complementing the existing DirecPC two-way service. In this vein, it is most interesting (and hardly surprising) that early studies suggest that most existing DirecTV subscribers would rather receive their broadband services from DirecTV than from their existing (or prior cable) system operator. The first of its kind, the GMH- Telocity system is expected to del

iver customers almost unlimited bandwidth. It should offer a choice of DSL where available, and two-way satellite broadband in circumstances where customers prefer satellite delivery, or where DSL is not and will not be available. In the end, the long-term success of every telecom provider, including the satellite ones, may well depend on the ability to bundle other telecom services to customers nationwide.

Ultimately, in order to truly penetrate the core of cable's 65 million subscriber base, satellite TV must continue to provide what cable has not been able to during recent years of competition. The DBS industry must correctly create and deploy new services, which include the superior customer service and proper pricing highlighted above. The importance of this strategy is further buttressed by the J.D. Powers consumer studies that say subscription TV customers are also rating satisfaction levels based upon the number and pricing of new and existing content services. DBS might have an advantage in this area, based upon its ability to instantly deliver nationwide accessibility, whereas cable faces piecemeal implementation, system-by-system, and related infrastructure costs that are huge. Yet, in order to stay competitive with cable, DBS must continue investing in its own infrastructure, spending billions of dollars on new satellites that are necessary to offer the required national bandwidth and t

he necessary signal speeds. Further, the recent AT&T Broadband announcement of system-wide rate increases is a perfect example of what the DBS (and cable) industries must avoid in order to enhance customer loyalty. Plus, especially through its trade group, the SBCA, and its relations with various governmental entities, the DBS industry must vigilantly promulgate signal standards that deliver the maximum in technical quality for all its subscribers, all the time, nationwide.

Even though some say that time is of the essence for both players, if the satellite industry continues to do what it's been doing, many more predict that, except for the most sophisticated digital cable areas, satellite will continue its lead for another five to ten years, at least. This is especially true in rural areas, where as many as 30 million Americans will be unable to receive adequate digital grade services from cable modems or digital subscriber lines for many, many years (if ever). Because again, in the end, the key, whether urban, suburban or rural, is delivering what consumers will buy--price points, quality, and choice. In the years ahead in rural U.S. cities alone, DBS is expected to acquire at least two thirds of this subscriber base, which will easily take the industry into the 40 million subscriber range that industry pioneer Stanley S. Hubbard spoke of over a decade ago (only to hear detractors say "DBS actually stands for 'Don't Be Stupid").

In summary, if satellite is to fill cable's shoes as the best choice for data, video and audio for the majority of the U.S. population, and if it is to become the reigning champion, it will all come down to what works for the consumer. In the end, it is the customer who will drive the "revenue per sub per month" vehicle down the 1,000-2,000 channel superhighway of tomorrow. That said, be it satellite- or cable-delivered, rest assured: things will work very well for the computer/telecom/media consumer of Sir Arthur Clarke's 21st century.

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<<VIA Satellite -- 03-10-01>>

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Press here to view Balance Sheet and P&L

Petah Tikva, Israel, May 15, 2000 - Gilat Satellite Networks Ltd. (NASDAQ: GILTF) today announced revenues of US$86 million for the first quarter ended March 31, 2000, an increase of 30 percent over revenues of US$66.1 million for the same period in 1999. Net income was US$6.5 million ($.28 per share).

Gilat Chairman and Chief Executive Officer Yoel Gat said, "Gilat continues to deliver solid results while providing its shareholders with participation in the tremendous growth opportunity of Gilat-To-Home".

COMSYS, the world's leading telecommunications consultancy specializing in satellite markets, recently announced its 1999 research update on VSAT market trends. The report named Gilat market share leader with a 51 percent share in the interactive data segment, and an overall market growth of 30 percent. This is the fourth consecutive year of market share growth for Gilat, and the first time in the Company's history to claim the number one position.

Chairman Gat stated, "It is an outstanding achievement for the company to have attained market leadership after many years of progressive success.We are proud to be #1 in our core business, and are confident that our satellite-based consumer broadband activities will benefit from our leadership in this competitive industry".

New York-based On Site Networks, Inc. (OSN) has chosen Gilat's Spacenet Inc. subsidiary to deliver its Women's Supermarket Network (WSN) custom television programming to 2,000 supermarkets nationwide. Television personality Joan Lunden serves as President and on-air host of WSN, which will use the Company's products and services for an interactive platform for custom content and advertising to the point of sale. One thousand sites are scheduled to be implemented by Fall 2000.

OSN Chairman Bob Jacobs called the relationship significant to the WSN launch. "We selected Spacenet because of its technology and infrastructure, which we believe is well suited to manage the rapid rollout of WSN," he said.

The Gilat Florida Inc. subsidiary will provide a 2,000-site VSAT network to Equus Gaming Company, L.P. (NASDAQ: EQUUS). Equus is a partnership with thoroughbred horseracing and entertainment interests in Latin America and the Caribbean. Equus will use Gilat's Skystar AdvantageÒVSAT network for interactive data applications at its four racetracks and its extensive network of off-track betting agencies. The network is already well into the deployment phase.

Gilat also announced it is providing GTECH Brazil with 1,900 Skystar Advantage VSAT terminals and satellite hub equipment. GTECH Brazil will use the equipment to support the expansion of CAIXA Economica Federal, the operator of the Brazilian national lottery. The new equipment is expected to be installed next month.

Gilat-To-Home Inc. (GTH) continues to execute on its first-to-market consumer broadband strategy. At present, GTH has over 1,500 pilot consumer sites installed and enjoying always-on broadband Internet connections.

Separately, Spacenet has begun the rollout of the RadioShack demo network, which will serve as GTH's initial retail channel. GTH expects to have 3,000 RadioShack stores capable of providing live customer demos when the consumer broadband service is officially launched in October 2000.

The Gilat shareholders' meeting is being scheduled for August 17, 2000. The meeting will be asked to consider, among other things, the report of the financials of the Company, the election of directors, the share split announced earlier, an increase in the shares authorized under the Company's stock option plan and such other matters as may be brought before the shareholders. The notice of meeting will be given in due course.

Gilat's teleconference to the financial community, scheduled today at 10:30 AM EST in the United States, will also be broadcast live over the Internet. The event can be accessed at http://www.gilat.com where there will also be a link for downloading the necessary software (Windows Media and Real Media).

Gilat Satellite Networks Ltd., with its global subsidiaries Spacenet Inc., Spacenet Europe and Gilat Florida Inc., is a leading provider of telecommunications solutions based on VSAT satellite network technology. The Company, based in Petah Tikva, Israel, provides satellite-based, end-to-end enterprise networking and rural telephony solutions to customers across six continents, and markets interactive broadband data services. The Company is a joint venture partner, with Microsoft Corp., EchoStar Communications Corp. and ING Furman Selz Investments, in Gilat-To-Home Inc., America's first consumer two-way satellite broadband Internet service provider. Gilat-To-Home is based in McLean, Va. SkyBlaster(TM), Skystar Advantage(R), SkyWay(TM), DialAway(R) and FaraWay(TM) are trademarks or registered trademarks of Gilat Satellite Networks Ltd. or its subsidiaries. Visit Gilat at www.gilat.com and Gilat-To-Home at www.gilat2home.com.

Certain statements made herein that are not historical are forward-looking within the meaning of the Private Securities Litigation Reform Act of 1995. The words "estimate", "project", "intend", "expect", "believe" and similar expressions are intended to identify forward-looking statements. These forward-looking statements involve known and unknown risks and uncertainties. Many factors could cause the actual results, performance or achievements of Gilat to be materially different from any future results, performance or achievements that may be expressed or implied by such forward-looking statements, including, among others, changes in general economic and business conditions, inability to maintain market acceptance to Gilat's products, inability to timely develop and introduce new technologies, products and applications, rapid changes in the market for Gilat's products, loss of market share and pressure on prices resulting from competition, introduction of competing products by other companies, inability to manage growth and expansion, loss of key OEM partners, inability to attract and retain qualified personnel, inability to protect the Company's proprietary technology and risks associated with Gilat's international operations and its location in Israel For additional information regarding these and other risks and uncertainties associated with Gilat's business, reference is made to Gilat's reports filed from time to time with the Securities and Exchange Commission.

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Hughes Electronics Corporation Response to
FCC Initial Request for Information dated February 4, 2002

Production #s: FCC2A000000858 – FCC2A000001086

Source: Holly Bowen
Hughes Network Systems

FCC Request Responsive to: XV.A.

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DAIN RAUSCHER WESSELS A DIVISION OF DAIN RAUSCHER INCORPORATED

EQUITY CAPITAL MARKETS ◆ INSTITUTIONAL RESEARCH

Bullish on Broadband

An Investor's Guide to Competitive Service Providers

Summary Themes

Compelling Broadband Opportunity: The growing demand for bandwidth and broadband services is an irreversible trend. We believe there will continue to be a solid and expanding opportunity to carry data and voice traffic and to own a customer base that can be leveraged to sell enhanced services on top of core bandwidth. As such, we are bullish on the growth and profit opportunities for competitive broadband providers. These companies are displacing incumbent market share in the $250-plus billion telecommunications services market and are well positioned to benefit from the ongoing growth in Internet, hosting, and content-related services.

Many Promising Enabling Technologies: Several technologies have emerged as viable broadband delivery options to businesses and residences—cable, digital subscriber line (DSL), broadband wireless, and fiber. Each has attracted pure-play services models that feature robust market demand, attractive unit economics, and high cash-flow visibility. As these technologies are in many respects complementary, and each has its relative strengths with respect to throughput, capital efficiency, and market reach, we expect many service providers to adopt a multi-technology approach to last-mile services in order to optimize network reach.

Numerous Viable Market-Entry Approaches: Using an abundance of market-entry options in major markets, including unbundled network element, lease, resale, and facilities-based approaches, many service providers are able to optimize such factors as capital deployment, network expense, speed to market, throughput, and customer reach. In our opinion, smart-build, hybrid-technology, and building-centric service providers show excellent promise as ways to play the demand for bandwidth and enhanced services.

Think Solutions, Not Bandwidth: In keeping with the technology-agnostic approach toward breaking the bandwidth bottleneck, we believe that sustainable value creation will result from delivering solutions, not just bandwidth. We believe that firms adding value to bandwidth by facilitating access to applications, content, and specialized services will experience the most sustainable growth.

Execution is Key: On balance, competitive providers find little difficulty in generating demand for their services, as they compete mostly against a slow-to-innovate incumbent. Thus, we believe success will hinge largely on competitors' abilities to accommodate rapid growth while offering superior service and reliability. We believe that this will come through strong execution on such items as provisioning, billing, service reliability, and customer support.

Market Catalysts: The competitive broadband segment has seen a steady wave of both smart-money investment and merger activity. We believe that the quest to incorporate additional technologies, offer enhanced services, and expand geographic and customer reach should continue to drive investment and M&A activity in the sector.

Broadband Services

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June 8, 2000

DAIN RAUSCHER WESSELS
EQUITY CAPITAL MARKETS

DAIN RAUSCHER WESSELS A DIVISION OF DAIN RAUSCHER INCORPORATED

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June 8, 2000

DAIN RAUSCHER WESSELS
EQUITY CAPITAL MARKETS

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Public Companies Mentioned in this Report

Adelphia Business Solutions	ABIZ	FirstWorld Communications	FWIS	NorthEast Optic Network	NOPT
Advanced Radio Telecom	ARTT	Focal Communications	FCOM	Northpoint Communications	NPNT
Allegiance Telecommunications	ALGX	High Speed Access Corp.	HSAC	Nucentrix Broadband Networks	NCNX
Allied Riser Communications	ARCC	iBeam	IBEM	Pac-West Telecomm	PACW
Broadwing	BRW	ICG Communications	ICGX	RCN Corporation	RCNC
CAIS Internet	CAIS	Intermedia Communications	ICIX	Rhythms NetConnections	RTHM
CapRock Communications	CPRK	Internet America	GEEK	SoftNet Systems	SOFN
Choice One	CWON	ITC^DeltaCom	ITCD	TALK.com	TALK
Convergent Communications	CONV	Log On America	LOAX	Teligent	TGNT
Covad Communications	COVD	McLeodUSA	MCLD	Telocity	TLCT
CTC Communications	CPTL	Metromedia Fiber Networks	MFNX	Time Warner Telecom	TWTC
Cypress Communications	CYCO	Mpower Communications	MPWR	Universal Access	UAXS
DSL.net	DSLN	Net2000 Communications	NTKK	US LEC Corp.	CLEC
eLEC Communications	ELEC	Netbjix	NETX	Williams Communications Group	WCG
Electric Lightwave	ELIX	Network Access Solutions	NASC	WinStar Communications	WCII
Excite@Home	ATHM	Network Plus Corp.	NPLS	Worldgate Communications	WGAT
FiberNet Telecom Group	FTGX	NEXTLINK Communications	NXLK	Z-Tel Technologies	ZTEL

Private Companies Mentioned in this Report

@Link Networks	CoreExpress	iSky	Picus Communications
2nd Century Communications	Darwin Networks	Jato Communications	PointOne Telecommunications
Actel Integrated Communications	Digital Access, Inc.	KMC Telecom	Prism Communication Services
AERIE Networks	Digital Broadband Communications	Knology	ReFlex Communications
America's Fiber Network	Edge Connections	LightNetworks	Road Runner
Arrival Communications	eLink Communications	LighTrade	Seren Innovations
ATG Group	Enron Broadband Services	LMA Systems	Skyway Partners
AuraServ Communications	Eschelon Telecom	Logix	SmartPipes
B2B Connect	Eureka Broadband	Maverix.net	SPEEDUS.COM
Birch Telecom	Everdream	Millennium Optical Networks	STSN
BlueStar Communications	Everest Broadband Networks	MobileStar Network	Switch & Data Facilities
Broadband Office	Extant	Netbeam, Inc.	TelePacific
Broadband Residential	EZ Net	NETtel Communications	Telseon
BroadbandNOW	Eziaz	Network Telephone	Tenant Connect
BroadLink Communications	Fiberlink Communications Co.	New Edge Networks	TeraBeam Networks
Broadslate Networks, Inc.	Flashcom	NewSouth Communications	Touch America
BTI Telecom	Florida Digital Network	OneNetPlus.com	TriVergent Communications
Carolina Broadband	Fuzion Wireless Communications	OnePoint Communications	Urban Media
Cbeyond Communications	Gabriel Communications	OnSite Access	Vectris Communications
Centerbeam	Global Broadband	Onvoy	Vitts Networks
Cidera	HarvardNet	PaeTec	Wayport
Clearwire Technologies	HighSpeed.com	Pathnet	Western Integrated Networks
Cogent Communicationws	Integra Telecom	PF.Net	WideOpenWest
Colo.com	InterAccess	Phatpipe	Wired Business
ColoSolutions	Internet Connect	Phoenix Networks	Yipes Communications, Inc.
ConnectSouth	IP Communications	Phonoscope Communications	Zyan

Section 1:
Executive Summary and Investment Themes

Section 1: Executive Summary and Investment Themes

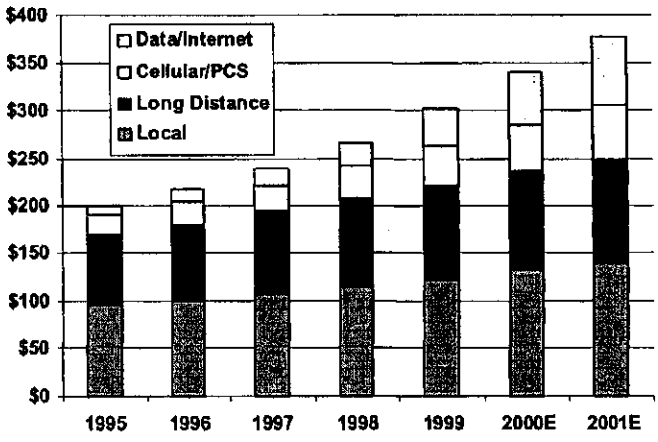
◆ The Market Opportunity

The market opportunity for competitive broadband providers can be summarized in the following points:

- There exists a large market for conventional telecommunications services.
- Internet and data-related opportunities should augment this market opportunity.
- Competitors currently occupy a small share of this market and are poised to grow their share significantly.
- Small and medium-sized businesses represent a particularly attractive sector for focus by competitive providers.

Large market exists for conventional telecommunications services. In raw numbers, the market for conventional voice and data communications is greater than $250 billion. This market is growing at slightly less than 10% per year, with the data portion growing at triple this rate, or approximately 30% per year.

Exhibit 1-1 ◆ United States Telecommunications Services Revenue

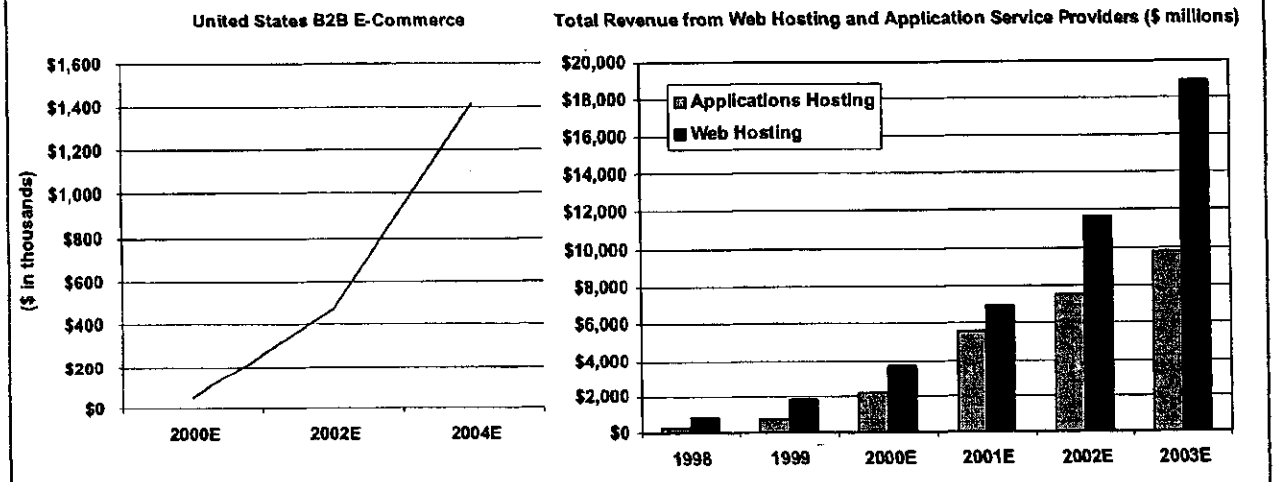


Source: FCC and Dain Rauscher Wessels estimates

Internet and data-related opportunities augment the current market. The Internet is a key driver of bandwidth demand among both businesses and consumers. New Web content and applications continue to proliferate at a rapid clip, increasing the utility and value of the Internet. On the consumer side, in addition to using e-mail to stay in touch with family and friends, individuals increasingly use the Web to conduct research, comparison shop, purchase products and services, and download content such as music and software.

Among businesses, the Internet, high-speed access, hosting, and other enhanced services are likewise gaining in popularity. Forrester Research predicts that business-to-business (B2B) e-commerce will grow at more than 125% on a compounded annual basis, from approximately $54 billion this year to more than $1.4 trillion in 2004. Of note, no less than five separate industry vertical segments are expected to generate more than $100 billion in e-commerce revenues by 2004. Such widespread usage of data-intensive applications should further drive demand for bandwidth and for Internet outsourcing services such as Web applications hosting, which are expected to grow into grow into $19 billion and $10 billion markets, respectively, by 2003.

Exhibit 1-2 ◆ Business Internet Trends

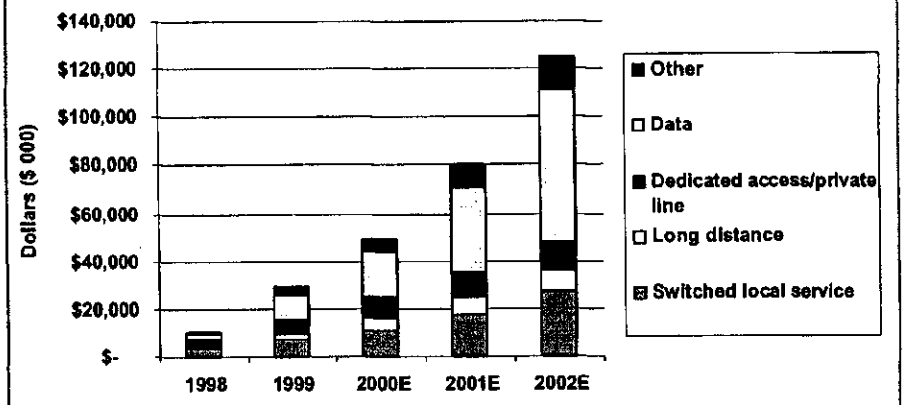


Source: DataQuest, Forrester Research, and International Data Corporation (IDC)

Competitors' share is poised to grow. Collectively, competitive providers served less than 5% of the telecommunications services market during 1999. Considering that they are generally able to offer more customized services than the slow-to-innovate, incumbent provider, competitors are finding few barriers to displacing the incumbent and gaining rapid market share. We believe that broadband access will fuel even greater competitive success in the coming years.

All told, we expect revenue growth by competitive providers to approximate 85% CAGR over the next three years, with data accounting for roughly 125% annual growth. In dollar terms, this translates into $125 billion by 2002, accounting for only about 15% of the overall market at that time.

Exhibit 1-3 ◆ Revenue Growth Trends for Competitive Providers



Source: New Paradigm Resources Group

The sweet spot for competitors—small and medium-sized businesses. The market opportunity with the small and medium-sized business (SMB) segment is particularly attractive for competitive providers. In terms of overall size, there are an estimated 7.4 million businesses in this segment, according to IDC. Collectively, these businesses generate approximately $58 billion in telecommunications spending per year. Yet incumbent service providers have typically overlooked the SMB market, due in large part to greater operating efficiencies associated with serving enterprise customers. Removing the bandwidth bottleneck and offering enhanced services to SMBs at economical price points presents a unique and lucrative opportunity for competitive broadband providers, who are generally able to offer more targeted services than incumbent providers as well as provide more responsive customer care. As an extension to the core business market, we believe opportunities exist in non-traditional commercial settings, such as hotels, multi-dwelling units, and frequently trafficked public venues such as airports and convention centers.

◆ Multiple Broadband Technologies

Several technologies have emerged as viable broadband delivery options to businesses and residences—cable, digital subscriber line (DSL), broadband wireless, and fiber. Despite their relatively high capital intensity, each has attracted pure-play services models that feature robust market demand, attractive unit economics, and high cash-flow visibility.

Fiber: While not a new technology, the use of fiber optics in the local loop has gained considerable momentum in the last five years. Today, compared to enhancing the copper plant (DSL) or cable plant, or deploying broadband wireless equipment, fiber remains the most capital-intensive way of installing local broadband capacity. Nevertheless, the capacity of fiber far exceeds the capabilities of other transmission media. Local fiber deployment is largely restricted to business markets whose bandwidth requirements are large enough to justify the costs of deployment.

With respect to inter- and intra-city transport, several new carriers have emerged during the past five years that have pursued regional or national strategies. Often, these networks were constructed along railroad, energy pipeline, or utility rights of way, with active financial backing from entities in these other industries. Many long-haul carriers offer a mix of retail services, which are provided directly to end-users, and wholesale or carrier services, which are provided to other carriers.

Wireless: Broadband wireless technology can be deployed to offer any broadband service at throughputs ranging from DS-0 (64 kbps) to OC-3 (156 Mbps) or greater, depending on the amount of spectrum. The technology generally requires a clear line-of-sight between two transceivers and can provide voice, two-way data, or video services. At present, there are multiple spectrum bands commonly used for two-way broadband communications over the last mile.

- **Unlicensed Microwave Bands:** Unlicensed microwave spectrum has been used for several years for last-mile services. The unlicensed bands can support a variety of broadband applications and reach customers 15-20 miles or more from a given hub site, depending on the specific frequency and technology utilized.
- **2.5 GHz:** Services at this microwave frequency are commonly known as multi-channel multi-point distribution service, or MMDS. MMDS was originally licensed to provide video services but has now been authorized by the FCC for any two-way communications service. In the first half of 1999, Sprint and WorldCom each spent more than $1 billion in acquiring the MMDS licenses of several companies. Both carriers are planning multi-city rollouts of two-way broadband services to residential and small business customers during the coming quarters.
- **24 GHz/ 28 GHz/ 39 GHz Millimeter-Wave Bands:** Teligent, NEXTLINK Communications, Inc. (Nasdaq: NXLK; Not Rated), WinStar, and Advanced Radio Telecom are the major "anchor tenants" at these millimeter-wave frequencies, which are used to deliver shorter-range (2-3 miles) but higher-capacity (DS-3 to OC-3) services in metropolitan downtown areas and business parks.

Because they do not require extensive rights of way or access to incumbent-carrier central offices, broadband wireless operators can enter new markets relatively quickly. Further, independence from the incumbent provides wireless carriers with more control of their networks relative to other technologies.

Digital Subscriber Line (DSL): Digital subscriber line (DSL) technology is quickly emerging as an economic solution for high-speed Internet access and remote LAN connections. DSL technology simply upgrades the performance of existing copper lines by installing electronics at both ends of the connection. With DSL, the average analog connection of 56.6 kbps can be upgraded to 1.5 Mbps or higher.

In order to deploy their networks, DSL competitors must collocate their equipment in the incumbent carrier's facilities and lease the actual copper lines that connect to the end user. However, because DSL technology uses the existing copper plant, it is significantly less expensive to deploy on a broad scale than other approaches, such as new fiber or cable construction. In addition, since phone lines are nearly ubiquitous in the United States, DSL providers are not limited to one market segment (e.g., business or residential) as are some other access technology providers.

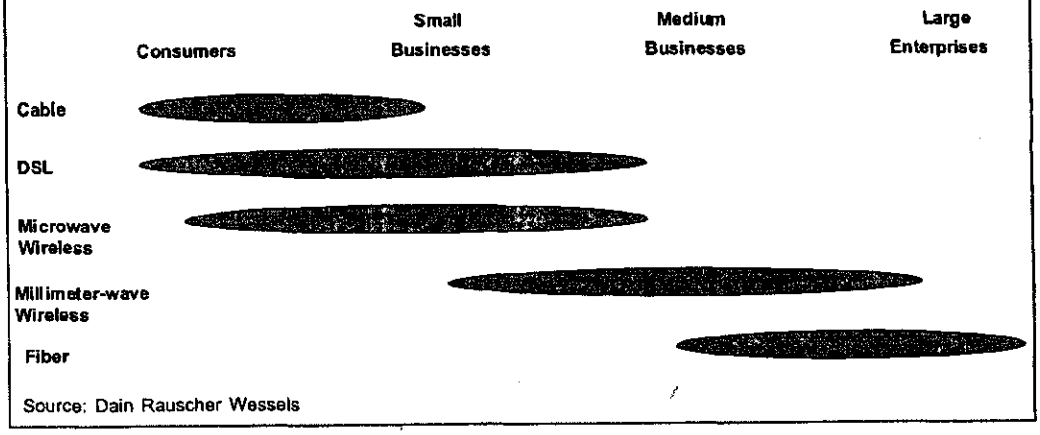
Cable (Hybrid Fiber/Coax): Aided by its conversion to digital technology as well as the growth of the Internet, the cable industry has emerged as a significant player in high-speed Internet services, especially for the residential segment. With nearly ubiquitous coverage, cable connections offer a powerful platform for providing residences and some businesses with broadband access. Leading operators in North America have formed ventures to address key technical, operating, content, and marketing challenges associated with the wide-scale deployment of cable Internet services. In addition, several cable overbuilders have emerged that are deploying state-of-the-art facilities in high-density residential markets and are offering bundled voice, video, and high-speed Internet services.

Cable Internet traffic utilizes the bandwidth of one or more analog television channels to provide downstream service from the Internet to the customer. This allows for a shared downstream bandwidth of between 27-39 Mbps, split between however many subscribers are served off a particular node. Upstream bandwidth usually exceeds analog speeds but is rarely greater than 500 kbps.

Overall Technology Perspective: Each technology has its strengths and weaknesses, and at these services' relatively early stage of commercialization, it is less a question of which technology will win than a question of how much share each will gain in the various market segments (enterprise vs. small business vs. residence, urban vs. suburban vs. exurban, national vs. regional vs. local). We believe that specialists in DSL, cable, wireless, and fiber can all gain significant share in their respective areas of strength and generate sustained value, as can companies that possess an array of technologies with which to address the local bottleneck.

Exhibit 1-4 provides a comparison of the various broadband technologies that have been commercially deployed as well as their target markets.

Exhibit 1-4 ◆ Broadband Technology Comparison



Source: Dain Rauscher Wessels

Given that these technologies are in many respects complementary, it is not surprising that many carriers are embarking on multiple facilities-based approaches and adopting a hybrid strategy. Two examples of this are NEXTLINK Communications and Adelphia Business Solutions, each of which holds LMDS spectrum in addition to fiber assets in its markets and is deploying DSL capabilities. In many other cases, carriers are choosing to partner with one another to expand their reach—examples include Intermedia Communications' partnership with Rhythms to provide DSL-based services, and Rhythms' strategic relationship with Excite@Home (Nasdaq: ATHM; Buy-Speculative; $20.50) to supplement that carrier's cable assets. We believe the future convergence of services will be fueled by the continued deployment of packet-switch architectures that are able to accommodate multiple types of traffic—this contrasts with many current deployments that utilize packet switches for data traffic and circuit switches for carrier-class voice traffic.

◆ Multiple Market-Entry Approaches

In keeping with our thesis that the strength of a services business does not rest with its technology alone, but rather with the quality of the solution that it is able to deliver to its end users, we believe it makes sense to consider additional categories of providers that are not as readily characterized by technology, namely smart-build providers and broadband facilitators.

Smart-build strategy accelerates time to market, reduces initial capex.

Smart-Build Strategy: In contrast to traditional network deployments, in which carriers install their own physical connections in each market, competitors employing the smart-build strategy often install their own switches in each market and then lease the local access from another provider. As with DSL-based approaches, the smart-build strategy leverages the regulatory framework of competitive access to incumbent unbundled network elements. Advantages of the smart-build approach include accelerated market entry and reduced initial capital expenditures in each market, allowing the competitor to focus its initial resources on sales, marketing, and operations support systems.

The clear tradeoff with this strategy is that the competitor is reliant upon the incumbent (or other carriers) to ensure that physical connections to the customer are maintained. Further, smart-build operators incur monthly costs for each line they provide, whereas facilities-based providers generally do not.

UNE-P—A Specialized Form of Smart-Build: As discussed in Section 3, UNE-P refers to the combination of several unbundled network elements to form a complete service platform. UNE-P competitors usually forego investment in local access and central office facilities, but their services go far beyond simple resale of the incumbent's in that they are customized offerings that often utilize their own (rather than the ILEC's) network intelligence and back-office capabilities. Further, many UNE-P carriers have their own facilities for offering Internet access, Web hosting, long distance, and other services. Because of the details surrounding its implementation, this strategy is best suited for the residential and small business markets, where UNE-P margins provide opportunity for a competitor to enter a market, gain critical mass, and eventually migrate to a more facilities-based local network if it so chooses.

Beyond Smart-Build—Smart-Aggregation: Given the abundance of available options for last-mile access, not to mention the myriad of choices for such services as transport, wide-area networking, and hosting, several carriers have emerged that seek to combine many of these services, often from disparate carriers, into a customized service suite. Depending on the mix of services purchased from competitive or incumbent providers, these "smart-

aggregation" carriers can in principle forego CLEC status altogether in cases where they do not require direct interconnection with the incumbent network. Freed of having to construct their own end-to-end networks, and able to choose from among best of breed network service suppliers, smart aggregators are often able to focus on providing customer solutions, rather than just offer bandwidth and connectivity.

The customers of "smart aggregation" carriers benefit from these providers' experience in ordering service from their suppliers as well as bulk purchasing synergies that come from aggregating the demand of multiple end users. As with many other competitive providers, "smart aggregators" seek to deliver a branded, one-bill, bundled service suite to customers.

Building-Centric Strategies: Broadband services are becoming a key component of value for commercial and residential properties. As real estate stakeholders rush to meet the demands of commercial and residential tenants, carriers are stepping up to the plate with a new generation of convergence products, engineered to distribute voice, data, and enhanced services to multi-tenant properties. Recently, a new crop of building-focused broadband service provider has emerged to meet tenant demand for high-speed services.

The building-centric service provider (BSP) strategy is to offer high-speed Internet access (and, in some cases, voice services), data networking, Web hosting, and enhanced services such as e-commerce and network-delivered applications to multi-tenant office buildings, multi-dwelling units, hotels, and/or public venues such as airports and convention centers. This approach is similar to that taken by the smart-build and smart-aggregation providers; however, it differs in execution due to the BSPs' strategic relationships with property owners, and the "pre-provisioned" nature of service installation (no truck roll required).

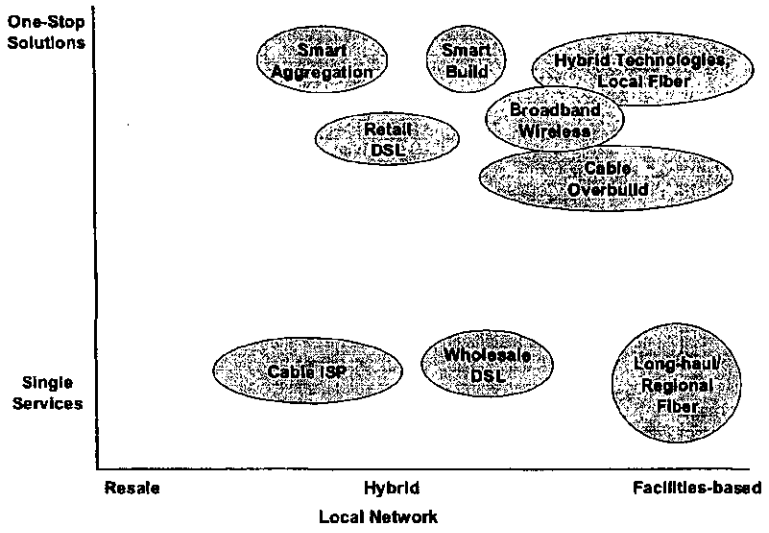
We summarize the various smart-build and related strategies along with other, technology-based market-entry approaches in the following exhibits.

Exhibit 1-5 ◆ Summary of Local Broadband Approaches

Approach	Strengths	Drawbacks/Limitations	Suitable Market Segments	Representative Public Players
Local Fiber	Highest bandwidth solution. Reliability. Flexibility (voice, video, data).	Expensive and labor-intensive deployment.	High-density business districts. Bandwidth-intensive enterprises.	ABIZ, ELIX, ESPI, ICIX, ICGX, T, TWTC, WCOM
Broadband Wireless	Quick deployment. Success-based deployment limits capital risk. Deployment is not dependent on establishing collocation with ILEC.	Requires clear line of site between transmitter and receiver. Susceptible to rain fade.	Businesses, Apartment buildings	ARTT, FON, NXLK, TGNT, WCII, WCOM
Cable	Cable plant passes nearly all homes. Deployment of two-way data services leverages ongoing investment in digital upgrades. No involvement with ILEC required.	Limited reach in businesses districts. Shared medium-requires special attention to data security as well as guaranteed minimum throughput. Provisioning currently requires one or more installers.	Residences, Multiple Dwelling Units.	ATHM, HSAC, RCNC, SOFN
DSL	Copper infrastructure reaches nearly all homes and businesses.	Distance limitations and certain technology barriers currently degrade about 15-30% of local loops from DSL enhancement. Deployment of DSL service requires extensive involvement with the ILEC. Provisioning requires one or more installers.	Small Businesses, Residences.	COVD, DSLN, NASC, NPNT, RTHM
Building-Centric	Focus on in-building infrastructure and customer base simplifies network deployment and provides marketing and operational efficiencies.	Reliance on third parties for access and transport may not enable full end-to-end network control.	Businesses in Multi-Tenant Buildings, Multiple Dwelling Units, Hotels, Airports, Convention Centers.	ARCC, CAIS, CYCO, SOFN
Hybrid Facilities-based	Multiple technologies expands network reach, increases addressable market and reduces technology risk.	Requires multiple technology and network competencies.	Businesses	NXLK, ABIZ
Smart-Build, Smart-Aggregation	Utilizes multiple access technologies and leverages network assets of varied suppliers.	Reliance on third parties for access and transport may not enable full end-to-end network control.	Businesses or Residences	ALGX, CONV, CPTL, CWON, FCOM, MPWR, NTKK, PACW
UNE Platform	Potential for rapid market entry and network scalability.	Not yet implemented in all states.	Residences, Small Businesses	TALK, ZTEL

Source: Dain Rauscher Wessels

Exhibit 1-6 ◆ Relative Positioning of the Various Market-Entry Strategies



Source: Dain Rauscher Wessels

◆ Market Catalysts

The competitive broadband segment has seen a steady wave of both smart-money investment and merger activity. We believe that the quest to incorporate additional technologies, offer enhanced services, and expand geographic and customer reach should continue to drive investment and M&A activity in the competitive broadband segment and underscore the appeal of this sector.

Access to Capital

As mentioned earlier, the broadband services business is capital intensive. Although the typical business model has a high degree of cash flow visibility, significant funding is required in the early stages for network deployment and market expansion. Given that the average competitive provider is funded until sometime in first half 2001, many companies will need to access the capital markets during the next few quarters.

The following exhibits depict the major public equity and public debt financings in the competitive broadband services sector during the past 18 months.